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NSQIP Analysis of Axillary Lymph Node Dissection Rates for Breast Cancer: Implications for Resident and Fellow Participation

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INTRODUCTION: Management of the axilla in invasive breast cancer (IBC) has shifted away from more radical surgery such as axillary lymph node dissection (ALND), towards less invasive procedures, such as sentinel lymph node biopsy. Because of this shift, we hypothesize that there has been a national downward trend in ALND procedures, subsequently impacting surgical trainee exposure to this procedure using the ACS-NSQIP database to evaluate this.

METHODS: Women with IBC were identified in the ACS-NSQIP database from 2007 to 2014. Procedures including ALND were identified using CPT codes. This number was divided by total cases, given a varying number of participating institutions each year. Next, cases involving resident participation were identified and divided by training level: junior (post graduate year–[PGY] 1-2), senior (PGY 3-5) and fellow (PGY $\geq$ 6). Two tailed z tests were used to compare proportions, with significance determined when $p < 0.05$.

RESULTS: A total of 128,372 women were identified with IBC with 36,844 ALND. ALND rates decreased by an average of 2.43% yearly from 2007 to 2014. Resident participation significantly drops in 2011, from 49.3% before to 29.4% after ($p < 0.01$). Junior residents experienced a significant decrease in participation rate (43.3%–32.2%, $p < 0.05$). Senior residents and fellows experienced an upward trend in their participation, although not significant (51.2%–56.3%, $p = 0.35$, and 5.6%–11.6%, $p = 0.056$, respectively).

CONCLUSIONS: Using the ACS-NSQIP database, we demonstrate the downward trend in rate of ALND for IBC with subsequent decrease in resident participation. Junior residents experienced a significant decrease in their participation with no significant change for senior or fellow-level trainees. Awareness of this trend is important when creating future surgical curriculum changes for general surgery and fellowship training programs. (J Surg Ed ▮:▮▮▮-▮▮▮. © 2018 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: breast cancer, axillary lymph node dissection, surgery, resident education

COMPETENCIES: Practice Based Learning and Improvement

INTRODUCTION

For the last 20 to 30 years, there continues to be shifting emphasis towards less radical axillary surgery for invasive breast cancer (IBC). Previously, axillary lymph node dissection (ALND) had been the standard of care and the most common surgical approach to the axilla in IBC. However, this procedure has been known to be associated with significant morbidity, including paresthesias, shoulder pain, weakness, lymphedema, and axillary web syndrome.[1] With recent surgical innovation and revolutionizing clinical trials,

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procedures for sentinel lymph node biopsy (SLNB) were developed for patients starting in the 1990s. SNLB was eventually established as the standard of care for women with node-negative IBC.[2–4]

Advances in knowledge of cancer biology, coupled with the questionable role of axillary lymph node removal in overall survival, has led researchers to investigate expanded criteria for SLNB alone in the management of early stage breast cancer.[5,6] Subsequently, results from the American College of Surgeons Oncology Group Z0011 (Z0011) trial demonstrated that not all patients with a positive sentinel node require a completion ALND.[7] This trial confirmed that, for patients with early stage IBC who were undergoing breast conservation therapy and receiving adjuvant therapy, there was no difference in local recurrence or overall survival between patients with 1-2 positive sentinel nodes who underwent ALND versus those who did not. Results of the Z0011 trial were published in 2011, with a subsequent significant shift in management of the axilla for breast cancer in subsequent years.[8–10]

This shift away from completion ALND in IBC has contributed to the ever-changing landscape of general surgery training for residents. Due to the increasing scrutiny facing the general surgery training process, including work hours and educational content, we sought to determine if there has been a decline in ALND procedures and if this decline would have an impact on resident exposure to the procedure. We hypothesized that there indeed has been a nationwide downward trend in ALND for patients with IBC and that this has had a significant impact on resident and fellow operative exposure to ALND, with resident exposure to ALND declining. We used the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database to evaluate the rates of ALND from 2007 to 2014. Using data collected in this database, we also sought to analyze resident and fellow exposure to this procedure over this time period.

METHODS

A retrospective analysis of the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) participant use files was completed using data from the years 2007 to 2014. NSQIP is an outcomes-based database that collects clinical data that includes preoperative risk factors, intraoperative variables, and 30-day postoperative mortality and morbidity outcomes for major surgeries in the inpatient and outpatient settings. The participant use files data used contains patient-level aggregate data that is Health Insurance Portability and Accountability Act (HIPAA) compliant, and does not identify hospitals, health care providers, or patients.[11] Because no patient identifiers were used in this study, it was therefore exempt from institutional review board review.

We selected all women aged 18 years or older with a primary diagnosis of IBC using ICD-9 code 16628 (malignant neoplasm of breast). Next, we identified all patients who had a procedure including ALND using CPT codes for partial mastectomy with axillary lymphadenectomy (19302), modified radical mastectomy (19307), superficial axillary lymphadenectomy (38740), and complete axillary lymphadenectomy (38745). Because the number of hospitals participating in the NSQIP database increased each year, we totaled the number of procedures and compared them to total number of IBC diagnoses to obtain the percent of patients with IBC diagnoses who underwent a procedure including ALND. Two tailed z tests were used to compare proportions of procedures performed versus diagnosis of IBC, with significance determined when $p < 0.05$.

Cases were then divided into 3 groups according to the level of resident physician present in the procedure, consistent with prior work by this group.[12] The groups included junior residents (post graduate year [PGY] 1-2), senior residents (PGY 3-5), and fellow (PGY $\geq$ 6). Data regarding presence and level of resident physicians in procedures was not available for years 2013 to 2014. Resident participation was compared between each year of available data. Two tailed z tests were used to compare proportions, with significance determined when $p < 0.05$.

A line of best fit was calculated between our yearly total ALND rates, with the slope of the line representing the overall average annual decrease in ALND rate.

RESULTS

From the years 2007 to 2014, a total of 128,372 women were identified from the ACS-NSQIP database with IBC, with a total of 34,798 ALND performed. Total cases of IBC and ALND per year are listed in Table 1. The total proportion of ALNDs performed for patients diagnosed with IBC undergoes a downward trend over this time period, from 35.4% in 2007 to 21.6% in 2014, with an average yearly decrease of 2.43% (Fig. 1). When comparing the change in rate of axillary dissection from one year to

TABLE 1. Comparison of Yearly Totals of ALND 2007 to 2014

Year	Total Cases of IBC	Total Cases of ANLD (% of Total)
2007	10,710	3787 (35.4)
2008	12,436	4440 (35.7)
2009	15,162	4931 (32.5)
2010	15,113	4627 (30.6)
2011	15,283	3999 (26.2)
2012	17,819	4301 (24.2)
2013	20,683	4137 (20.0)
2014	21,166	4576 (21.6)